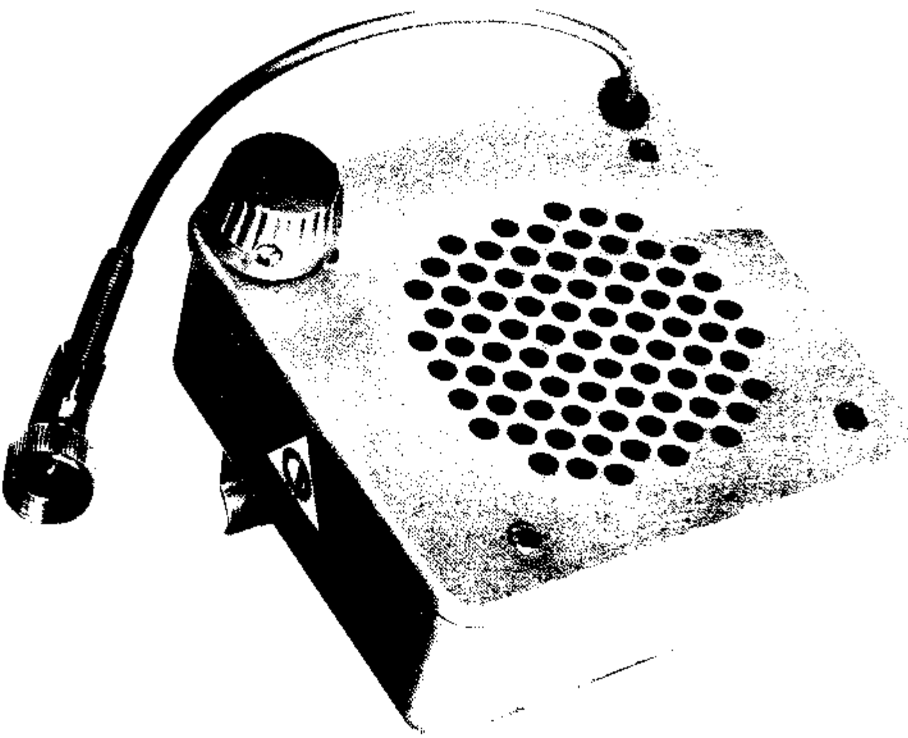
instruction and maintenance manual

LOUDSPEAKER

OCD Item No. CD V-705 Model No. 1



Jordan Electronics

A DIVISION OF THE VICTOREEN INSTRUMENT COMPANY

ALHAMBRA, CALIFORNIA

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1.0 PRECAUTIONS

The CD V-705 is designed to be dust proof and resistant to the effects of high humidity. Immersing the unit in water or other liquids and subjecting it to moisture should be avoided. Also, sharp objects that penetrate the holes in the speaker panel may cause damage to the speaker cone.

2.0 GENERAL DESCRIPTION

2.1 Introduction:

The CD V-705 is a battery operated loudspeaker attachment for the CD V-700 geiger counter. The device is for use as a training aid to amplify the pulses usually heard in headphones and make them audible to a group of people.

The unit will produce one pulse in the loudspeaker for each output pulse of the geiger counter over the entire range of pulse rates up to 30,000 counts per minute.

2.2 Electronic Circuitry:

A transistor circuit is mounted on an epoxy-fiberglass printed circuit board which is attached to the loudspeaker. The circuit serves to amplify the output pulse from the geiger counter.

2.3 Physical Features:

The CD V-705 is housed in a deep drawn cold-rolled steel case finished in a tough yellow enamel. The case is of a size that does not interfere with the normal use of the geiger when the CD V-705 is attached. The weight, including batteries, is approximately 1-1/2 lbs.

3.0 THEORY OF OPERATION

The operation of the loudspeaker attachment circuit is based on transistor current amplification. The loudspeaker (LSI) produces an audible reproduction of geiger counter pulses.

Refer to the circuit schematic Fig. 2, Page 6. With no input pulse, all transistors are in their "off" state. The voltage divider R3 and R1 biases

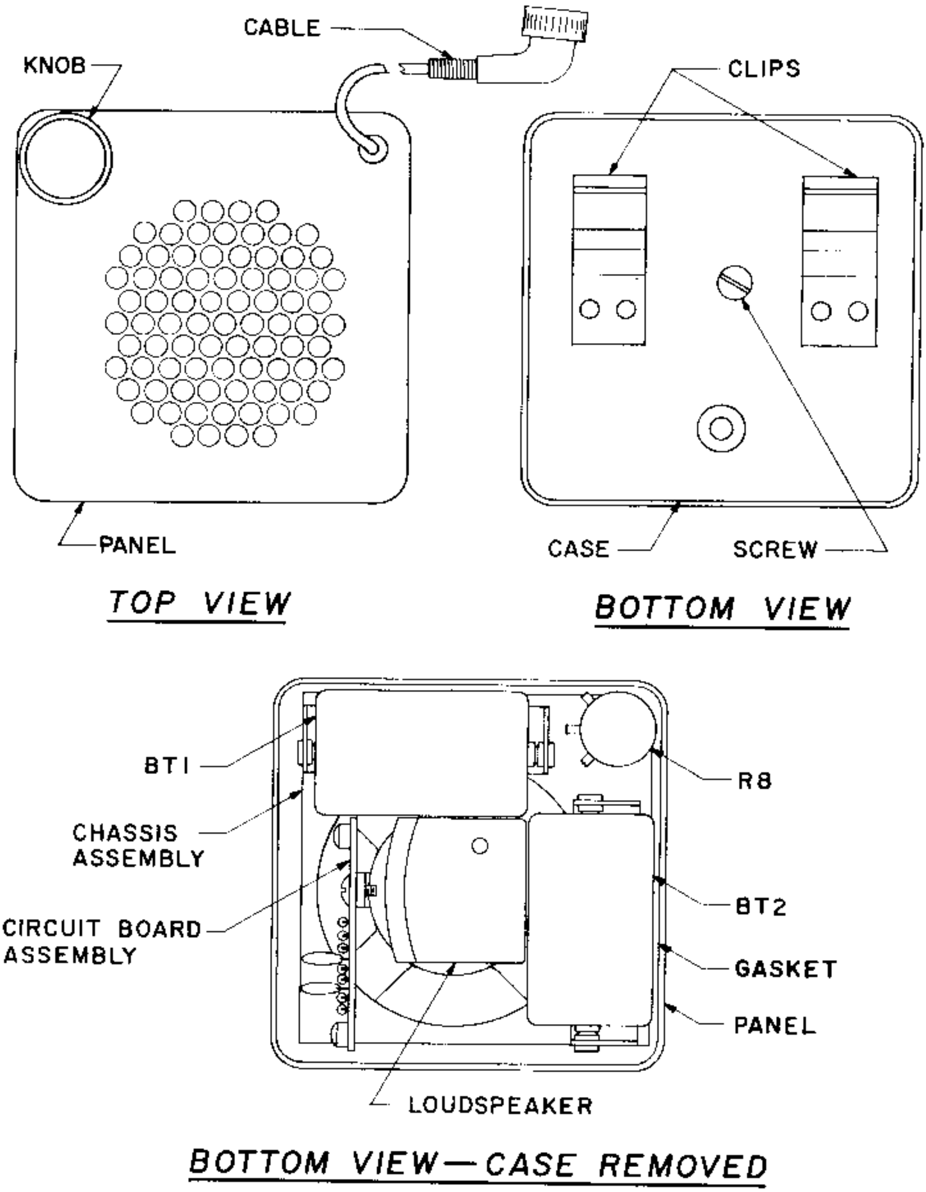

CABLE
KNOB
CLIPS
PANEL
CASE
SCREW
TOP VIEW
BOTTOM VIEW
BT1
CHASSIS ASSEMBLY
CIRCUIT BOARD ASSEMBLY
R8
BT2
GASKET
PANEL
LOUDSPEAKER
BOTTOM VIEW—CASE REMOVED

Figure 1

the base of Q2 at approximately .5V below its emitter. Approximately .7V between base and emitter is required to turn this silicon transistor "on".

When the negative pulse from the geiger counter output is applied to connector J1, it is coupled through C1 to the voltage divider R3 and R1, producing a voltage between emitter and base of Q2 greater than .7V. This allows current to begin to flow through Q2 from emitter to base. By transistor action, a greater current begins to flow through Q2 from emitter to collector. The collector current flowing through Q2 flows through Q3 from base to emitter allowing greater currents to flow through Q3 from collector to emitter. As the collector current flows through Q3, its collector voltage drops lower. As this point drops in voltage, the voltage at the base of Q2 drops, due to the lowering of the voltage applied to the divider R3 and R1, turning Q2 more "on". This feedback action, triggered by the input pulse, continues until Q2 is fully "on". This takes a very short time.

The collector to emitter currents through Q3 flow through Q4 from base to emitter producing greater currents through Q4 from collector to emitter. This collector current passes through the coil of the loudspeaker (LSI) and the volume control (R8), producing an audible sound.

When Q2 turns "on", the collector voltage increases to nearly 3V. By the coupling of capacitor C2, to the base of the reset transistor Q1, the base voltage is well above the emitter voltage. As C2 discharges through R2 the high voltage at the base of Q1 decreases toward the low voltage of the collector of Q3 until it is .7V below its emitter. Now current may flow through Q1 from emitter to base producing greater current to flow through Q1 from emitter to collector. The turning "on" of Q1 raises this collector voltage to less than .7V. This action clamps Q2 "off" thereby resetting the circuit.

The purpose of resistors R5 and R7 is to allow a path for collector-base leakage currents through Q3 to Q4 to be drained away.

4.0 INSTALLATION

Preparation of the CD V-705 for operation is quite simple. Remove the case by loosening the case screw. This screw can be turned with a coin inserted in the slot. Install the batteries in the brackets. Observe the polarity markings on the batteries and the brackets. The circuit will operate only when the batteries are installed correctly with respect to polarity. Do not install leaking batteries. Replace the case, noting that the case can be oriented in only one position with respect to the panel due to the screw being off-set from the center of the unit. Finally, tighten the screw.

5.0 OPERATION

The CD V-705 is attached to the left side of the geiger counter by means of the metal clips on the CD V-705. The clips attach to the flange of the geiger counter cover.

The cable is then fastened to the output phone connection of the geiger counter. The shound level is increased by turning the volume control knob in a clock-wise direction.

6.0 OPERATOR'S MAINTENANCE

Operator's maintenance should be limited to replacing the batteries, cleaning the contacts and inspecting for visible faults. Battery replacement is indicated by a drop-off in sound level. Install new batteries as indicated in Section 4.

7.0 PREVENTIVE MAINTENANCE

The only preventive maintenance required is removal of the batteries when the unit is to be stored more than a few weeks or not used for 30 days or longer, and cleaning the battery contacts if they appear corroded.

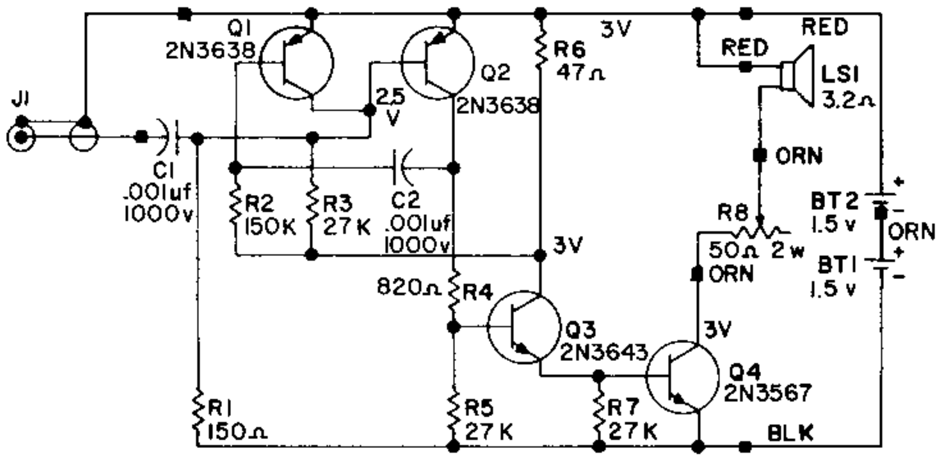
8.0 CORRECTIVE MAINTENANCE

When a malfunction cannot be corrected by the steps in Section 6, further steps can be taken by a competent electronic technician.

Reference should be made to the schematic diagram, Fig. 2, and wiring diagram, Fig. 3, on Page 6.

For corrective maintenance, proceed as follows:

1. Check cable connection (J1) and cable for continuity and shorts.
2. Check all wire terminations and solder joints.
3. Check for shorts between speaker coil (speaker terminal with orange wire) and speaker frame. The resistance between these two points should be approximately 3.2 ohms which represents the coil resistance. (Note: The circuit has a positive ground to the unit housing.)
4. Check C1 and C2 for shorts and capacity value.
5. Check transistors per manufacturer's specifications as indicated by part number given in the parts list.
6. Check all resistors for correct resistance values.



NOTE: 1. VOLTAGES REFERENCE TO BT1 (−); MEASUREMENTS MADE IN OFF STATE WITH A 20,000 OHMS/VOLT METER.

2. ALL RESISTORS ARE 1/4 W, 10 % UNLESS OTHERWISE NOTED.

Figure 2 — Schematic, Diagram

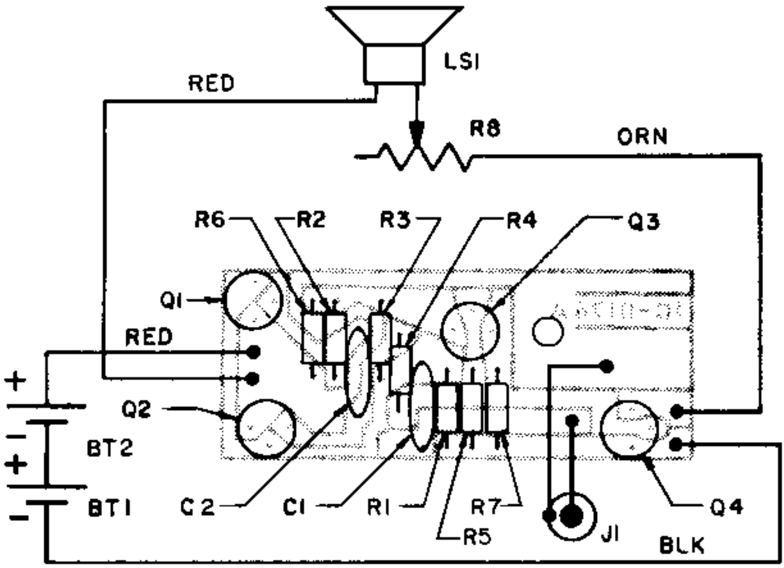


Figure 3 — Wiring Diagram

9.0 PARTS LIST

9.1 ELECTRICAL PARTS

CIRCUIT SYMBOL	DESCRIPTION & FUNCTION	MFGR. & PART NO.	JORDAN PART NO.
	CIRCUIT BOARD ASSEMBLY	JORDAN	AE-0607
BT1, BT2	BATTERY, 'D' CELL	EVEREADY #950	BA-0005
C1	CAPACITOR, CERAMIC DISC. .001µf, 1000V (COUPLING)	SPRAGUE #10TS-D10	CC-0061
C2	CAPACITOR, CERAMIC DISC. .001µf, 1000V (RESET TIME)	SPRAGUE #10TS-D10	CC-0061
J1	CONNECTOR	AMPHENOL #75-MC-IFA	JF-0103
LSI	LOUDSPEAKER	JORDAN	ES-0003
Q1	TRANSISTOR (RESET)	FAIRCHILD 2N3638	QY-0073
Q2	TRANSISTOR (INPUT)	FAIRCHILD 2N3638	QY-0074
Q3	TRANSISTOR (DRIVER)	FAIRCHILD 2N3643	QY-0075
Q4	TRANSISTOR (OUTPUT)	FAIRCHILD 2N3567	QY-0076
R1	RESISTOR, 150K, 1/4W, 10% (VOLTAGE DIVIDER)	ALLEN-BRADLEY	RX-0353
R2	RESISTOR, 150K, 1/4W, 10% (RESET TIME)	ALLEN-BRADLEY	RX-0353
R3	RESISTOR, 27K, 1/4W, 10% (VOLTAGE DIVIDER)	ALLEN-BRADLEY	RX-0352
R4	RESISTOR, 820 OHMS, 1/4W, 10% (VOLTAGE FEEDBACK)	ALLEN-BRADLEY	RX-0352
R5, R7	RESISTOR, 27K, 1/4W, 10% (LEAKAGE CURRENT PATH)	ALLEN-BRADLEY	RX-0352
R6	RESISTOR, 47 OHMS, 1/4W, 10% (VOLTAGE FEEDBACK)	ALLEN-BRADLEY	RX-0350
R8	POTENTIOMETER, 50 OHMS, 2W (VOLUME CONTROL)	CTS P-115	RP-0011

9.2 MECHANICAL PARTS (REPLACEABLE)

DESCRIPTION	MFGR. & PART NO.	JORDAN PART NO.
CHASSIS ASSEMBLY	JORDAN	AM-0090
CASE ASSEMBLY	JORDAN	AM-0091
GROMMET, CABLE	ACCURATE RUBBER & PLASTIC GB-210	HG-0057
GASKET, CASE	JORDAN	HG-0125
RIVET, SEMI-TUBULAR BRAZIER HD. 1/8"x1/2" SCP	JORDAN	HR-0041
RIVET, SEMI-TUBULAR BRAZIER HD. 1/8"x3/8" SCP	JORDAN	HR-0042
PUSHNUT	PALNUT #PS125006	HX-0509
KNOB, CONTROL (WITH SET SCREWS)	JORDAN	MD-0014
WASHER, FELT (POT.)	JORDAN	MF-0003
WASHER, FELT (KNOB)	JORDAN	MF-0004
PANEL, SPEAKER	JORDAN	MS-0805
CABLE	BELDEN #8411-15	UJ-0123

9.3 NAMES AND ADDRESSES OF MANUFACTURERS

Accurate Rubber & Plastics Co., 3951 Hiquera Street, Culver City, California
Allen-Bradley Company, 1201 So. Second Street, Milwaukee, Wisconsin
Amphenol Connector Div., Amphenol Corp., 1830 So. Fifth Street, Chicago, Ill.
Belden Manufacturing Co., P.O. Box 5070A, Chicago, Ill.
CTS Corporation, 1142 W. Beardsley Ave., Elkhart, Indiana
Fairchild Semi-Conductor Corp., 545 Whisman Road, Mountain View, Calif.
Palnut Company, 10-A Glen Road, Mountainside, New Jersey
Sprague Electric, 481 Marshall Street, North Adams, Mass.
Tinnerman Products Inc., P.O. Box 6688, Cleveland 1, Ohio
Union Carbide (Eveready), 270 Park Ave., New York 17, N.Y.